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MOUNTAIN PINE BEETLE IMPACT SURVEY ON THE NINEMILE DISTRICT, LOLO NATIONAL FOREST, AND SURROUNDING STATE AND PRIVATE LANDS

by

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ABSTRACT

The mountain pine beetle, *Dendroctonus ponderosae* Hopk., has been at epidemic levels in second-growth ponderosa pine stands in the Ninemile area of the Lolo National Forest and surrounding private lands since 1969. An impact survey, using two levels of photography and a small ground sample, was conducted to estimate a loss of 592,469 board feet of ponderosa pine on 2,592 acres of infested land. The infestation is expected to continue at about the same level in 1973.

INTRODUCTION

The mountain pine beetle, *Dendroctonus ponderosae* Hopk., can be a serious pest of second-growth ponderosa pine stands. Infestations generally are associated with overstocked stands and continue until susceptible host material has been depleted. An infestation on the Lolo National Forest and surrounding State and private lands has existed in the Ninemile area since 1969. There are about 30,000 acres of pine type in the infestation, but only about 2,592 acres are within the heavy infested zone.

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EXPERIMENT STATION

SURVEY METHODS

Photographs were taken in September on a 9-inch format with a Zeiss RMKA 15-23 aerial camera equipped with a 6-inch focal length lens and a K-36 CC filter. Two levels of true color photography were utilized for photo interpretations. Full coverage on 30,000 acres was made at a photo scale of 1:15840. A semi-controlled mosaic was obtained from the photos and the area of heavy infestation was stratified to delineate 2,592 acres of heavy infestation (fig. 1). This was defined as stands with an abundance of fading and red-topped pines. Low-level photography at 1:6000 was used for precise counts of 1971 faded trees. Interpretations were made on nine 1/2-acre circular plots numbered sequentially on each photograph. Interpretations were made on a total of 117 1/2-acre plots that fell within the 2,592 acres of infestation. Twenty 1/2-acre plots were then selected from the 117 plots for ground cruise by a computer program PPSORT. Selection was on probability proportion to size; that is, plots with large counts of red-topped and fading trees had a proportionately greater chance of being selected. PPS sampling in the past proved to be efficient in reducing sampling error. Plots that were selected by the computer were then visited and 100 percent ground cruise was conducted. Information on each tree 5 inches d.b.h. and larger in the plot was tallied and recorded as to species, diameter, and total height. Ponderosa pines were classed into one of the five tree classes:

0 - green, uninfested
1 - current attack in 1972; brood in cambium
2 - attacked in 1971; faded or red foliage, brood emerged
3 - 1970 or older attacks
4 - pitchouts

Results of the data were analyzed by a modified ADP timber sale cruise program which provided summaries by infestation levels, volume loss by year, and residual stand composition for each ground cruise plot.

RESULTS

Results of this survey show that the mountain pine beetle killed an estimated 592,469 board feet of ponderosa pine over the past 4 years on the 2,592 acres of infestation. Losses amounted to 114,696 board feet in 1972 and 146,122 board feet in 1971 (table 1). This survey revealed in the past 2 years the infestation has declined in amount of board foot losses and trees per acre. This seems very typical of an infestation under stress as the larger trees are killed first and the smaller trees last. PPS sampling again proved to be efficient in reducing variance. Sampling error could possibly have been reduced further if the photography had been taken earlier. Ground cruise was conducted in October and November and revealed that some of the trees attacked in 1972 had already faded. The results were that some current attacked trees were visible on the photo and counted as 1971 attacks,

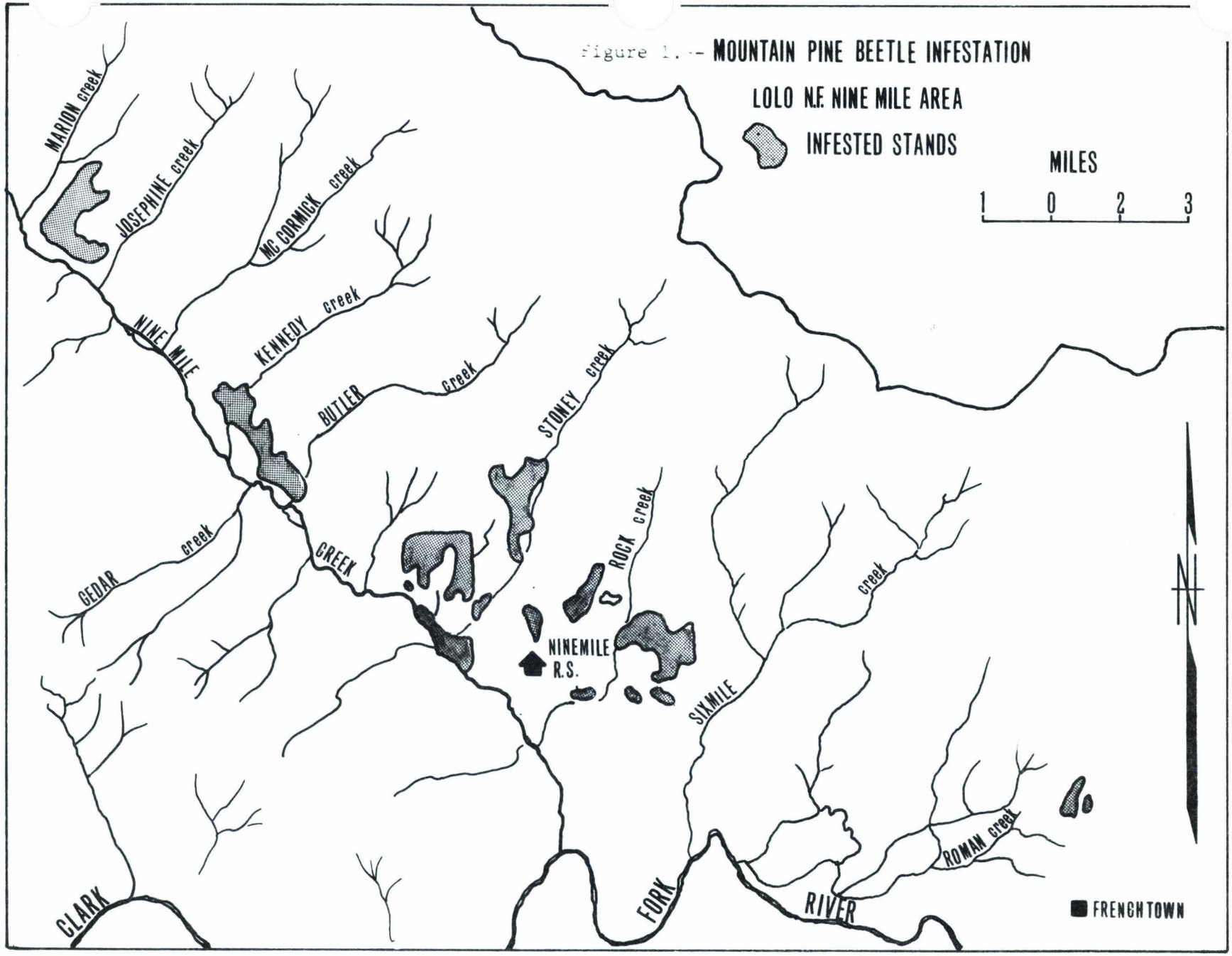
Figure 1. -- MOUNTAIN PINE BEETLE INFESTATION
LOLO N.F. NINE MILE AREA
INFESTED STANDS
MILES
1 0 2 3
MARION creek
JOSEPHINE creek
MC CORMICK creek
NINE MILE
KENNEDY creek
BUTLER creek
STONEY creek
ROCK creek
CEDAR creek
GREEK
NINEMILE R.S.
SIXMILE creek
ROMAN creek
CLARK FORK RIVER
FRENCHTOWN

thereby increasing sampling error. Ground crews had no difficulty in finding the center of the 1/2-acre circular plots when using 1:6000 scale photography. It took four men approximately 2 hours to 100 percent cruise a 1/2-acre plot.

Remote sensing proved to be an efficient method to estimate beetle losses. Interpretations were made on 2.38 percent of the area surveyed, and only 10 acres or 0.38 percent of the area was actually cruised. Sampling error on 1971 infested trees was 22 percent.

Table 1.--Mountain pine beetle losses in the Ninemile drainage since 1969 by year

Year	Trees		Volume (board feet)	
	Per acre	Total	Per acre	Total
1972	4.22 ± 25.4%[1/]	10,959 ± 25.4%	44.25 ± 33.4%	114,696 ± 33.4%
1971	7.43 ± 22.4%	19,270 ± 22.4%	56.37 ± 29.5%	146,122 ± 29.5%
1970 and older	19.61 ± 34.5%	50,836 ± 34.5%	127.90 ± 32.7%	331,651 ± 32.71%
Total	31.26	81,065	228.52	592,469

1/ ± 1 standard error (%)